Patent Claims

1. A cooling system (18) for cooling down cooling air (K) which is tapped off from the compressor air (V) in a gas turbine, by means of a heat exchanger system (21) which is connected on the primary side in a cooling air line (17) that is tapped off from the compressor air line, which heat exchanger system (21) transfers heat that is carried in the cooling air (K) to a combustion gas flow (23) which is supplied to the combustion chamber (6) of the gas turbine.

2. The cooling system (18) as claimed in claim 1, in which the amount of heat supplied to the combustion gas flow (23) is variable.

3. The cooling system (18) as claimed in claim 1 or 2, whose heat exchanger system (21) is connected on the secondary side to a number of circuit elements which are connected in parallel on the heat flow side.

4. The cooling system (18) as claimed in one of claims 1 to 3, whose heat exchanger system (21) comprises a heat exchanger (22) whose secondary side is connected directly in the combustion gas flow (23).

5. The cooling system (18) as claimed in one of claims 1 to 3, in which the heat exchanger system (21) is connected on the secondary side via an intermediate circuit to a further heat exchanger (24), which is itself connected on the secondary side in the combustion gas flow (23).

6. The cooling system (18) as claimed in claim 5, via whose intermediate circuit an auxiliary steam generator (38) can be heated.

7. The cooling system (18) as claimed in claim 6, in

which the connection on the heat side of the heat exchanger system (21) to the further heat exchanger (24) is produced via an auxiliary steam generator (50).

8. A gas turbine system (1) having a turbine (2) to which a flow element which is tapped off from the compressor air flow can be supplied as cooling air (K), having a cooling system (18) as claimed in one of claims 1 to 7.

9. A method for cooling the cooling air (K) for a gas turbine, in which heat which is extracted from the cooling air flow is transferred to the combustion gas flow (23) which is supplied to the combustion chamber (6) of the gas turbine.

10. The method as claimed in claim 9, in which the amount of heat which is supplied to the combustion gas flow (23) is matched to the operating state of the gas turbine system (1).

11. The method as claimed in claim 9 or 10, in which the heat flow which is extracted from the cooling air (K) is split into a number of flow elements.

12. The method as claimed in one of claims 9 to 11, in which the amount of heat is transferred via a heat exchanger (22) whose secondary side is connected directly in the combustion gas flow (23).

13. The method as claimed in one of claims 9 to 11, in which heat is transferred from the cooling air line (17) to the combustion gas flow (23) via an intermediate circuit (32).

14. The method as claimed in claim 13, in which an amount of heat is transferred to an auxiliary steam generator (50), which is connected in the intermediate circuit (32).

15. The method as claimed in claims 9 to 14, in which,

in a first circuit (42), an amount of heat is transferred from the cooling air flow by means of a first heat exchanger (22) to an auxiliary steam generator (50) which is connected in a first circuit (46) and, finally, is transferred to the combustion gas flow (23) by means of a further heat exchanger (24).